

APPENDIX "A"

To estimate runoff from direct rainfall, soils and antecedent moisture needs to be considered.

This section describes adjustments to runoff based on rainfall and NRCS's runoff curve numbers (RCN). Figure 1 shows a generalized map of RCN's for the state. These RCN's were developed from stream gage runoff data and weighted rainfall data. These numbers were then correlated with soils and land use. The most detailed discussion of RCN development is in NRCS's TR-55 (Urban Hydrology). The RCN is based on soils, vegetative cover, land use and antecedent moisture. Soil scientists have divided soils into four hydrologic soil groups (HSG's).

HSG "A" Soils have low runoff potential. Infiltration rates are greater than 0.30 inches per hour. HSG "B" Soils have moderate infiltration rates of 0.15 to 0.30 inches per hour. These soils are silt loams or loams.

HSG "C" Soils have low infiltration rates of 0.05 to 0.15 inches per hour. These soils are Sandy clay loams.

HSG "D" Soils have very low infiltration rates of less than 0.05 inches per hour. These soils are made up of clays.

A complete list of soils with their HSG is included in NRCS's TR-55. RCN's for various land uses and crops by HSG is included in TR-55. Table 1 shows broad ranges of RCN's.

Antecedent soil moisture can be estimated by using antecedent rainfall. Adjustment to the RCN can be made to estimate direct runoff. To do this the daily rainfall values for the month are tabulated. Antecedent rainfall could extend for as much as 30 days preceding the rainfall event. Five day antecedent rainfall gives very good results and added periods of time does not necessarily give additional accuracy.

To adjust for runoff, Used the nearest precipitation gage. Using the daily rainfall values, estimate antecedent rainfall to adjust the SCS runoff curve number for each days rainfall event. Then added the daily runoff at the end of each month. The adjustments follow.

A guide to approximate Antecedent moisture.

Total of 5 day antecedent rainfall

CONDITION	Dormant Season	Growing Season
I (Dry)	Less Than 0.5 Inch	Less than 1.4 Inch
II (Average)	0.5 to 1.1 Inch	1.4 to 2.1 Inch
III (Wet)	Over 1.1 Inch	Over 2.1 Inch

To adjust the curve number for RCN of 80. Table 10.1 of NRCS National Engineering Handbook, Part 630(Hydrology).

CONDITION	I	RCN 63
	II	RCN 80
	III	RCN 94

It is sometimes desirable to interpolate between these numbers.

|-----1952-----||-----1955-----||

Day	Mar	Anti. Moist	Run-off	Feb	Anti. Moist	Run-off
1	0.00			0.00		
2	0.33	I	0.0	0.00		
3	0.68	I	0.0	0.00		
4	0.09			0.60	I	0.03
5	0.00			0.04	I	0.0
6	0.00			0.00		
7	0.05	I	0.0	0.00		
8	0.24	I	0.0	0.00		
9	0.00			0.00		
10	0.72	I	0.0	0.10	I	0.0
11	0.00			Trace		
12	Trace			0.00		
13	0.00			0.00		
14	Trace			0.00		
15	0.07	I	0.0	0.00		
16	0.00			0.00		
17	Trace			0.00		
18	0.32	I	0.0	2.02	I	0.10
19	0.00			0.42	III	0.10
20	0.00			0.00		
21	0.22	I	0.0	0.00		
22	0.20			0.00		
23	0.00			Trace		
24	0.00			0.42	II	0.0
25	Trace			0.00		
26	0.00			0.30	II	0.0
27	0.00			0.00		
28	0.00			0.00		
29	0.00			---		
30	0.00			---		
31	0.00			---		
Total	2.92		0.0	3.90		0.23

GENERALIZED RUNOFF CURVE NUMBERS

	HYDROLOGIC SOIL GROUP		
	A	B	C
CROPLAND			
NOT TREATED	81	88	91
TREATED	74	80	82
PASTURE			
NOT TREATED	79	86	89
TREATED	69	79	84
FOREST			
NOT TREATED	66	77	83
TREATED	55	70	77
OTHER	79	86	89

Treated is properly managed to control erosion. Cropland is terraced with waterways and residue left on ground. Pastures have good livestock rotation. Not treated is the absence of proper land use and treatment.